Plasma Electrolytic Oxidation (PEO) of aluminum with pulsed DC current

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Wear protection

EO is an anodization technique where the applied voltage is sufficiently high to create plasma discharges within the electrolyte at the surface of the treated sample. This allows forming thick crystalline coatings with improved properties such as resistance to wear, corrosion etc. In this study, we treated aluminum samples for 15 to 45 min at 0.06 A/cm², with a cell voltage reaching up to 350 V.
At the macroscopic scale, the coatings formed are uniform, with a typical PEO surface morphology: pancakes of melted Al2O3with holes formed by individual arcs at their center.
A XRD analysis of the coating confirms the presence of the gamma-Al2O3 (39° and 46°) increasing with treatment time.
Our presentation will further show the influence of the critical electrical parameters, more specifically the pulse duration, on the thickness, crystallinity and phase distribution of the alumina coatings